SECTION 3

UST CLOSURE AND CHANGE-IN-SERVICE

3.1 General Discussion

The purpose of this section is to provide clear, consistent, and meaningful guidance to owners and operators who are closing their USTs (either by removal or closure-in-place) or performing a UST change-in-service. This section is based on the State requirements for UST closure and change-in-service established at HAR 11-281, Subchapter 8. A copy of HAR 11-281, Subchapter 8 is included as Appendix 3-A. Although this guidance is comprehensive in nature, it is recommended that owners and operators not attempt to undertake closure of their USTs on their own. Admittedly, some of the steps for closure are simple, such as the requirement for owners and operators to notify DOH of the intent to close. However, most activities associated with closure are quite technical in nature, and can be highly dangerous to the untrained person. As such, personnel with appropriate experience, education, and training should be called upon to undertake most closure activities. DOH realizes that some owners and operators may want to be more involved in the closure activities for their USTs and would want to closely monitor the actions taken by their consultants/contractors. With this in mind, DOH has prepared a closure checklist which owners and operators may use to plan for and oversee the proper closure of their USTs. This checklist is provided in Appendix 3-B.

3.2 Basic Steps for Closure

The basic steps required to close a UST are identified in Figure 3.1.
In general, owners and operators are required to:

1. Notify DOH in writing (See Appendix 3-C for DOH forms "Notice of Intent to Close Underground Storage Tanks" or Notice of Intent for Change-in-Service of Underground Storage Tanks) at least 30 days prior to commencing permanent closure.

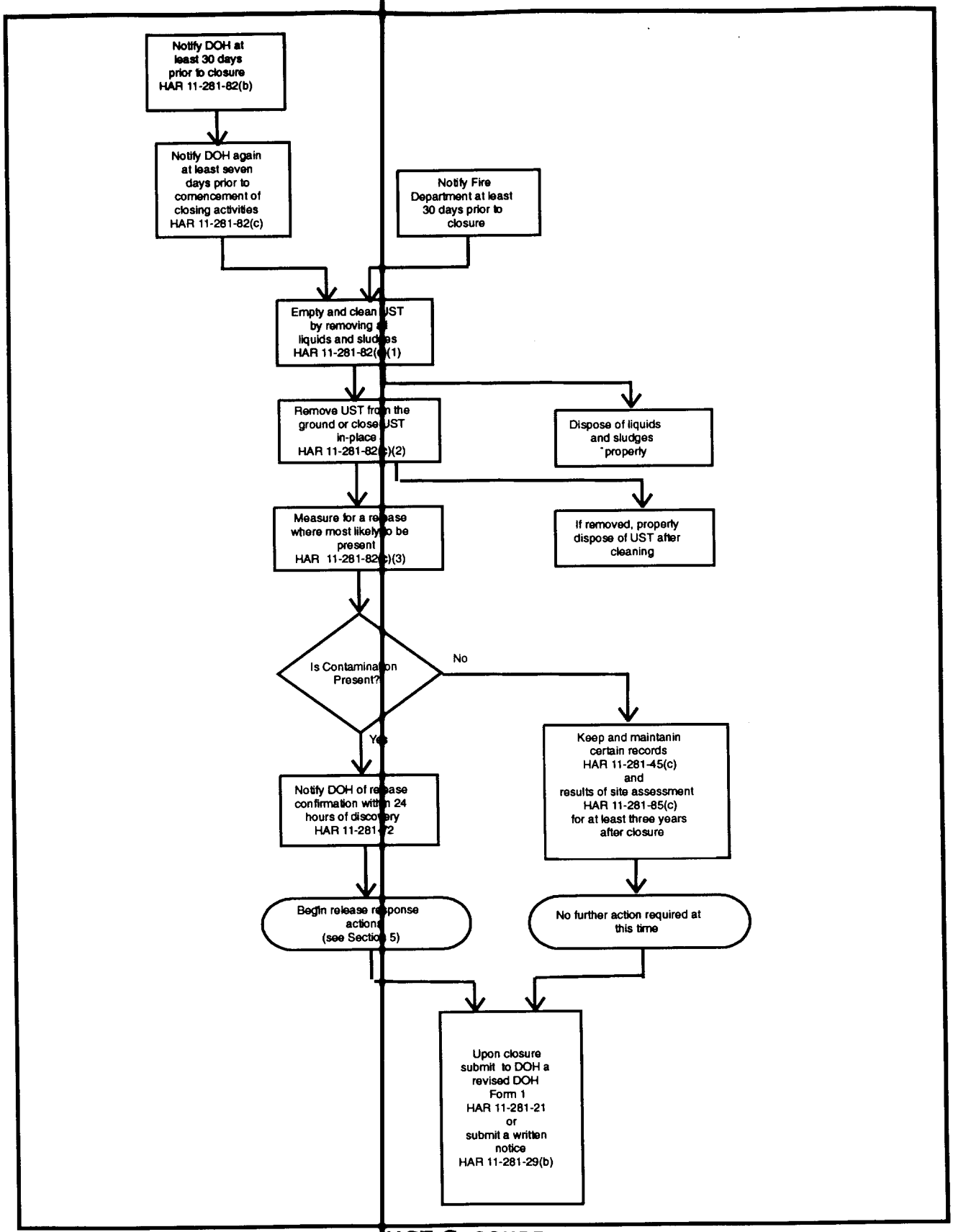

FIGURE 3.1 REQUIREMENTS FOR UST CLOSURE

2. Notify DOH again at least seven days prior to beginning a UST closure and provide the **exact date** that such activity will occur. Written correspondence is not required for this notification. Contact with DOH via telephone (808-586-4226), or fax (808-586-7509), to confirm the exact date of tank removal.

3. Properly clean and remove (or close-in-place) the UST (i.e., the tank and associated piping) in accordance with this guidance manual and appropriate industry codes and practices. In addition, particular attention should be paid to applicable State and Federal safety and health requirements.

4. Measure for the presence of a release in areas beneath the UST where contamination is most likely to be found. If a release is confirmed, as per field measurement, observation, smell, or laboratory results, notify DOH by telephone (808-586-4226), or fax (808-586-7509), within 24 hours and begin release response actions (i.e., release abatement, free product removal, release impact characterization, release investigation, cleanup, etc.). If the release is discovered on a weekend or holiday when the DOH office is closed, and the release presents an emergency situation, the owner and operator should contact the DOH's Office of Hazard Evaluation & Emergency Response at (808) 247-2191. See Section 5 for guidance on release response.

5. When removing USTs, for safety and as soon as practicable, properly backfill the excavation and piping trenches after conducting any necessary cleanup activities and procuring the necessary samples to document the condition of the site at closure. If UST excavation(s) are to remain open, proper safety measures or a temporary backfill may be necessary in order to prevent added danger of an open excavation during business operations at the site. When closing a UST in-place, a site assessment needs to be performed to verify that there have been no releases.

6. Maintain site assessment records on the UST closure or change-in-service for at least 3 years after completion of closure to document and prove compliance with HAR 11-281-85(c). (For liability and informational reasons, it is recommended that records be kept even longer.)

7. Owners and operators must submit within 30 days of closure a revised DOH Form No. 1, "Notification for Underground Storage Tanks" for tanks brought into use before January 28, 2000. For tanks brought into use after January 28, 2000, owners and operators must submit a

written notice pursuant to HAR 11-281-29(b) to DOH 30 days after completing the closure or change-in-service activity to reflect the status of the UST. See Appendix 3-D for DOH Form No.1.

The State UST closure regulations are also applicable to the replacement or a change-in-service of a UST. A UST replacement is both a closure and a new tank installation event. Therefore, the State requirements for both closure (HAR 11-281, Subpart 8) and installation (HAR 11-281, Subpart 2) are applicable. In particular, a site assessment (i.e., sampling data) upon closure is required to ensure that no releases of regulated substances have occurred from the existing UST. A change-in-service means that a UST will hereafter be used to contain only non-regulated substances. Closure in this case also requires a site assessment (i.e., sampling data) prior to the completion of the change-in-service.

2.1 Reporting and Recordkeeping

The State UST regulations are designed to be self-implementing by owners and operators of USTs. The essence of this self-implementation philosophy is good reporting and recordkeeping which are essential in documenting the compliance status and progress of all UST activities. This requirement to report, document, and keep records is reflected throughout the State UST regulations.

The owner and operator must notify DOH in writing of their intention to close or perform a change-in-service of a UST at least 30 days prior to commencing closure or change-in-service activities. Appendix 3-D provides copies of the DOH Forms "Notice of Intent to Close Underground Storage Tanks" and the "Notice of Intent for Change-In-Service of Underground Storage Tanks." The owner and operator must notify DOH again at least 7 days prior to tank removal. Telephone or fax is acceptable for this 7 day notification. Once UST closure is completed, the owner and operator should submit DOH Form No. 1, "Notification for Underground Storage Tanks" for tanks brought into use before January 28, 2000. For tanks brought into use after

January 28, 2000, owners and operators must submit a written notice pursuant to HAR 11-281-29(b) to DOH after completing the closure activity to reflect the closed status of the UST. Owners and operators should also maintain records that demonstrate compliance with all the closure requirements (HAR 11-281, Subpart 8) for at least 3 years after the completion of the UST closure. As such, it is ideal to assemble all closure information in a single report which thoroughly demonstrates compliance with the State UST closure requirements and any other environmental laws that may apply to the closure activity. This report serves as evidence of compliance in the event that DOH, or any other interested agency or person, questions the nature and details of the closure. To standardize the information collected, and to help organize and describe the activities undertaken during a UST closure, owners and operators or their consultants/contractors are advised to use the UST closure report format in Appendix 3-E. The information outlined is the minimum information which should be included in the report. This recommended format specifies the level of detail that is needed to properly document the closure.

If the UST closure investigation indicates no evidence of a petroleum release to soil or groundwater, then owners and operators are not required to submit a UST Closure Report to DOH. However, information regarding UST closure activities should be available for inspection, or submittal, upon request by DOH for at least three years following UST closure. In particular, findings, conclusions, and recommendations provided by the consultants which indicate that a UST did not have a release should be supportable and well documented. If an owner and operator does choose to submit a Closure Report to DOH which documents that no release occurred at the UST site, DOH will respond with a letter to the owner and operator stating that the information provided indicates that "no release occurred" at the site.

In cases where a release has been confirmed during UST closure activities, the information in the UST Closure Report should be included as part of the Initial Release Response Report submitted to DOH within 90 days of discovery of a release (see Subsection 5.3.4).

3.4 Basic Elements of Closure

3.4.1 Closure Planning

Proper planning for closure is essential. Before conducting any physical closure activities, owners and operators should gather to the extent feasible, all relevant information which pertains to both the UST and the site. This often involves searching for records on activities of all the businesses which have been located at the site. Sources of information regarding previous site activities may be obtained from governmental agencies, previous business owners, vendors, landlords, neighbors, previous employees, etc. Closure planning should also include detailed plans on how to empty the UST, clean the UST, excavate and remove the UST, assess the excavation for releases and backfill the excavation. Procuring a qualified consultant/contractor for this job is particularly critical. A directory of consultants/contractors is maintained by DOH as an informational resource to owners and operators. Finally, all closure activities planned must adhere to applicable health and safety requirements.

3.4.2 Pumping Out Remaining UST Contents

Remaining contents or product in the UST should be pumped out prior to any excavation and removal of the UST, or closure-in-place (if authorized by the local fire authority). The UST is considered empty when the tank contains no more than 2.5 centimeters (one inch) or 0.3 percent by weight of the UST's total capacity. The

pumped-out material should be properly disposed of. For pumped-out material, recycling and reuse are preferred and encouraged. In most cases where the content of the UST is a usable or a reusable petroleum product, it would be rare and costly that such product is actually disposed of as a waste. If the UST contains waste oil, such material should be handled as a hazardous waste if it exhibits the characteristics of a RCRA hazardous waste. Recycling and reuse of waste oil or used oil should meet the applicable requirements of RCRA and DOH's used oil requirements (see Subsection 6.4 on Petroleum Product).

3.4.3 Removal and Disposal of Sludge and Sediments

Sludge and sediments from petroleum USTs should be analyzed for hazardous waste characteristics, and if it meets the definition of a hazardous waste, sludges and sediments must be handled as hazardous wastes (see Subsection 6.5 on management of sludge and sediments).

3.4.4 Decontaminating the Tank

Minimizing the volume of water and cleaning agents used to rinse tanks is encouraged. Rinsate is subject to the toxicity characteristics leaching test, and if it fails the test, then it must be managed as a hazardous waste. If not, then rinsate may be treated and disposed of in a similar manner as contaminated ground water. Rinse water can be treated on-site on a case-by-case basis prior to discharging or disposal of the treated water. However, in no cases may rinse waters (treated or untreated) be discharged into U.S. waters without meeting the discharge requirements of the Clean Water Act, nor may they be disposed of in an underground injection well without meeting underground injection requirements (see Subsection 6.6 on Rinsate). A permit or approval from the DOH Clean Water Branch and/or the Safe Drinking Water Branch are required for these types of discharge.

3.4.5 Excavation and Removal of the UST

Upon excavation and removal, tanks and piping should be carefully inspected for evidence or indications of leaks and structural failures (e.g., corrosion, holes, and stress cracks). These observations, together with records of tightness test results, may be sufficient to conclude that contamination found was attributed to a UST release. In some cases, contamination may not be evident even when corrosion or holes are found on the tank. A corroded or failed UST which has not been used for years could mean that a release may have occurred years ago even though there may not be immediate evidence of a release in the excavation. All tanks and piping should be adequately cleaned and decontaminated. Cleaned tanks can be recycled as scrap metal, disposed of at landfills, or used again to store substances. However, one should be mindful that during the UST removal process, many of these USTs undergo tremendous stress and strain, and their integrity for reuse for whatever purpose may have been compromised. Therefore, these USTs are more susceptible to leaks when reused. Health and safety of the workers and the public are again critical when doing excavation and removal work. Federal and State health and safety requirements should be adhered to at all times (see Section 8 on Health and Safety.)

Excavation and removal of USTs may generate various contaminated materials. These include contaminated soil under and around the UST, contaminated ground water, and portions of concrete and asphalt pavement and other debris which may be contaminated. Efficient and proper handling, treatment, storage, and disposal of most of these types of materials are highly dependent on the degree of contamination of the material.

In order to minimize the quantity of contaminated materials, and thus the costs for their ultimate treatment and/or disposal, it would be prudent to separate and segregate as much of the materials as possible. Good management habits are essential here, and it is important that the Project Coordinator actively and closely supervise employees and oversee contractors to ensure this efficiency and control. Efficient and

proper handling, treatment, storage, and disposal of materials are essential in minimizing costs, exposure, and liability to both the owner and operator and their consultants/contractors.

Materials may be separated by the types of materials which are contaminated (i.e., soil versus concrete and asphalt). Also, the types of materials should be segregated by the degree of contamination (i.e., heavily contaminated soil, heavily contaminated concrete and asphalt, moderately contaminated soil, moderately contaminated concrete and asphalt, non-contaminated soil, and non-contaminated concrete and asphalt, etc.). Field measurement methods can be highly useful for this purpose.

As materials are excavated and removed, contaminated materials should be placed on an impervious surface to prevent the spread of contaminants onto non-contaminated areas. If contaminated materials are to be stored either onsite or offsite overnight or for any lengthy period of time, they should be fully covered by an impervious, durable tarpaulin which would effectively prevent contaminants from blowing, leaching, or running off to non-contaminated areas during heavy wind and rainfall episodes.

Contaminated soil and ground water may be treated and/or disposed of onsite or offsite depending on such factors as the quantity of contaminated soil or ground water; land use of the area; the proximity of the site to water wells, sensitive environments, and potentially affected populations; the appropriateness and feasibility of specific treatment technologies for the site; and the timeliness of the remediation with respect to pending development and construction activities. Cleanup activities and contaminant levels left onsite must be adequately protective of human health and the environment; and meet the cleanup criteria discussed in Section 5 of this TGM. **In cases, where contaminated soil is transported offsite, transporters are required to notify DOH Office of Solid Waste Management prior to transporting the contaminated soil offsite, and may be required to obtain a transporter's permit. Petroleum contaminated soil may only be transported to a permitted solid waste management**

facility. For the purposes of off-site transport, petroleum-contaminated soil is defined as soil that contains petroleum-related constituents at concentrations greater than reuse standards set forth by the DOH Office of Solid Waste Management. Note that these standards are more stringent than the Tier 1 action levels discussed in Section 5 of this TGM. For additional information, see Subsection 6.2 on Contaminated Soil and Subsection 6.3 on Contaminated Ground Water.

3.4.6 Evaluation of the Excavation for Releases

All closures must include site assessments to measure for the presence of contamination at locations where contamination are most likely to be found.

3.4.6.1 Field Measurement Methods

To determine if a release has occurred, the excavation and the excavated soils should be screened for contamination using field measurement methods. The advantage of using field measurement methods is that they are generally less costly and provide results more quickly than laboratory analysis of samples. Owners and operators should particularly note that these methods are used more for qualitative screening purposes and cannot be substituted equally for the higher quality of data obtainable from laboratory analysis of samples. There are too many variables which are likely to compromise the reliability of field measurement data. While field measurement methods can often be used to determine if a release **has** occurred, they cannot be used in most cases to verify that a release **has not** occurred.

Some of the field measurement methods include dynamic and static head space analysis methods, active and passive soil vapor methods, and field test kits. In addition, there are field analytical instruments. General field instruments commonly being used include flame ionization detectors (FID) such as the OVA, photoionization detectors (PID) such as the HNu, portable gas chromatograph (GC), combustible gas

indicators (CGI), hydrogen sulfide meters, oxygen meters, and colorimetric detector tubes. All field instruments should be properly calibrated prior to their use in the field, and in some cases they should also be periodically calibrated throughout their use in the field. Personnel who use field instruments or any field measurement methods should be adequately trained.

When measuring for the levels of Total Volatile Hydrocarbons (TVH), the FID is often the instrument of choice because it measures the concentrations of a broader range of hydrocarbon vapors (alkane and aromatic). The PID, on the other hand, is generally more sensitive to volatile aromatic hydrocarbons, and as such its measurements are not as representative of the broader range of hydrocarbon fuel vapors sought after in TVH measurements. A detailed discussion on field measurement methods is provided in Appendix 7.G.

3.4.6.2 Soil and Ground-Water Sampling

The sides and floors of the tank excavation and the piping trenches should be screened for potential releases. If ground water is present in the excavation or trenches, the ground water should also be screened for potential releases. If any field measurements indicate a release; or if odor, soil stains, or sheen on ground water indicate a release, DOH must be notified by telephone or fax within 24 hours, and the owners and operators should proceed to respond to the release as per the release response requirements of HAR 11-281, Subchapter 7 (See Section 5 of this TGM on Release Response).

If during the excavation activities, neither the soil nor the ground water is obviously contaminated, samples of the soil and ground water from the excavation and trenches for laboratory analysis should be taken to verify the condition of the site. **Analyze the soil and ground-water samples for Total Petroleum Hydrocarbons (TPH) measured as gasoline, diesel, and/or oil, (see Tables 3.1 and 7.1).** If products other than petroleum

were stored in the UST, then characteristic contaminants associated with those products should be tested for.

Soil sampling should be done at locations where contamination is most likely to be found. These locations include areas which have been stained or measured relatively high by a field method, and areas where corrosion holes in the tank were found. Absent of any indications of contamination, usually one soil sample for USTs of less than 1,000 gallons, two soil samples for USTs of 1,000 to 10,000 gallons, and three or more soil samples for USTs of more than 10,000 gallons, and samples at every 20 feet of the native soil beneath the piping in the trenches or at the native soil beneath every pipe joint, elbow, or other fittings are usually considered to be sufficient numbers of samples (see Table 3.2). All soil samples for tanks are taken at the depth where native soil is encountered beneath the UST bed. In the previous edition of this

Table 3.1 Recommended Minimum Verification Analysis for UST Closures

Substance Stored	**Unknown**	**Unleaded Gasoline**	**Leaded Gasoline**	**Diesel, Jet Fuel, Kerosene, Fuel Oil**	**Waste Oil**
Analytical Analysis	TPH as gasoline, diesel, oil and grease	THP as gasoline	THP as gasoline	TPH as diesel	TPH as oil and grease TPH as diesel

TGM, the compositing of up to five piping trench samples was permitted. However, the DOH Policy Update titled *Update and Clarification of Recommended Soil and Groundwater Sampling Procedures* dated September 9, 1996 (see Appendix 5-F) provided DOH's position that compositing of soil samples (either in the field or laboratory) for **volatile compounds** was prohibited. This is intended to ensure that the soil samples are disturbed as little as possible to avoid the loss of volatile compounds

prior to analysis. Therefore, only pipe trench samples collected for non-volatile compounds may be composited for laboratory analysis.

If ground water is encountered in the excavation and there is no visible or olfactory evidence of a release, then a grab sample of the groundwater should be collected from the excavation and submitted to a laboratory for analysis. Laboratory analytical data related to groundwater grab samples are considered by DOH to be qualitative in nature and cannot be used for comparison with DOH-recommended groundwater action levels. As such, there is generally no need to have grab samples analyzed for additional constituents of concern as normally required for determination of residual contaminant concentrations (e.g. halogenated volatile organic compounds and PAHs). If analytical results of the soil and groundwater samples shows contaminant levels to be below detection limits, then no further action is required, and the data serves to confirm that no release has occurred. However, if the analytical data shows contaminant levels to be above detection limits, a release is indicated. DOH must be notified of the release within 24 hours and the owner or operator should proceed to respond to the release as per the release response requirements specified in Section 5 of this TGM.

Depending on the particular level of contaminants measured, the owner and operator may choose to perform some abatement measures before analyzing the soil and groundwater samples for chemical-specific constituents as specified in Table 7.2 for the particular product or waste stored in the tank. If a release to the groundwater is confirmed, either by field observations or laboratory analysis of a grab sample, then a properly designed monitoring well(s) should be installed at the site to allow for the collection of a representative groundwater sample to be analyzed for chemical-specific constituents as specified in Table 7.2. The well(s) should be installed in the area where the highest magnitude of groundwater impact is suspected. This will generally coincide with the area in or immediately surrounding the former excavation. Monitoring well design and installation, and sample collection and analysis should here

Table 3.2 Recommended Soil and Ground-water Sampling for Permanent UST Closure

Owners and operators should measure for the presence of a release when contamination is most likely to be present at the UST site. In selecting sample types, sample locations, and measurements, owners and operators must consider the method of closure, the nature of the stored substance, the type of backfill, the depth to ground water, and other factors appropriate for identifying the presence of a release (40 CFR 280.72).

Scenario A: Water Not Present in Tank Excavation

1) Samples should be collected from the native soil beneath the tank.

2) If areas of obvious contamination are observed in the excavation, they are to be sampled.

3) Areas of likely contamination into the excavation based on locations of corrosion holes on the tank, are to be sampled.

4) Absent of any indications of contamination, the following chart should be used to determine the number of soil samples.

Tank size	Minimum number of soil samples	Location of soil samples
Less than 1,000 Gallons	ONE per tank	FILL or PUMP end of Tank
1,000 - 10,000 Gallons	TWO per tank	ONE at each end of Tank
Greater than 10,000 Gallons	THREE of more per tank	ENDS and MIDDLE or generally spaced along the length of the tank
Piping	ONE or more	EVERY 20 LINEAR FEET, preferably at piping joints, elbows, and beneath dispensers

Scenario B: Water Present in Tank Excavation

1) The tank excavation may be purged and allowed to refill before sampling. The purged water is to be properly handled and disposed.

2) The water sample is to be representative of water in the tank excavation.

Tank size	Minimum number of soil samples	Location of soil samples	Minimum number of water samples of soil samples
10,000 Gallons or less (single tank)	TWO	From wall next to tank ends at soil/ground-water interface	ONE
Greater than 10,000 Gallons or Tank Cluster	FOUR	From wall next to tank ends at soil/ground-water interface	ONE

Note: Adapted from the "Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Storage Tanks" California Regional Water Quality Boards (June 2, 1988).

to the guidelines presented in Section 7 of this TGM. These sampling and analytical data can serve as documentation to verify the residual contaminant levels at the site, and be the basis for no further action if the chemical constituent levels are below DOH's recommended cleanup criteria.

If contamination is evident while excavating and removing the UST and it appears that the contaminated soil and/or groundwater have been sufficiently removed or remediated to where field measurements, odor, and observation in the excavated pit indicate that residual contamination is minimal, then removal of at least two additional feet of native soils from the sides and bottom of the excavation pit and one foot from the sides and bottom of the trenches is recommended to ensure that all contaminated soils have been excavated before taking samples for verification (site-specific conditions may effect whether to increase or decrease the amount of overexcavation).

3.4.7 Backfilling of the Excavation

After completing all necessary cleanup activities required for release response and procuring the necessary verification samples to document residual levels and protectiveness, the owner and operator can then proceed to backfill the UST excavation pit and the piping trenches with uncontaminated soil, or proceed to install a new UST system to replace the old one. If a site is intended to be actively used, the excavation should be backfilled or adequately secured from the public as soon as practicable for safety reasons.

In some cases, it may be necessary for an excavation to remain opened for a lengthy period of time if a contaminated site is undergoing soil and ground-water investigation and/or remediation. For safety reasons, owners and operators should secure the excavation to prevent public access to the site if the excavation will remain open for a long period of time (see Section 8 on Health and Safety). Measures should also be taken to prevent or minimize rain waters from entering an excavation which may be

contaminated. An overflow of contaminated water from an excavation will exacerbate the contamination at a site. Use of tarpaulins, liners, berms, and runon/runoff diversion barriers may be sufficient for this purpose.

Temporary backfills may also be used in cases where the excavation is posing danger or logistical problems related to the on-going business operations at a site.

3.5 Closure-in-place

The State UST regulations allow closure of USTs in-place. However, most UST closures in the State of Hawaii involve the excavation and removal of the UST (both the tank and piping) because, with few exceptions, County fire departments require USTs to be removed. In certain circumstances, this requirement may be waived (e.g., likely structural damage to a building adjacent to or overlying a UST). The owner and operator should contact the appropriate local fire authority for applicable local requirements for a closure-in-place. After the local fire authority approves of the closure-in-place and notification is provided to DOH, the cleaned UST can then be filled with an inert solid material (e.g., cement slurry, sand, etc.). All tank openings, including vent lines, should be capped or plugged.

For closures-in-place, site assessments are nevertheless required. In these cases, the assessment may be more difficult to conduct since the tank is not excavated and removed. Use of slant boring methods or through-the-tank boring techniques may be used to obtain samples of the soil and groundwater beneath the tank. In addition, soil and groundwater samples may be obtained at points downgradient of the tank's location.